

Technical Data Sheet

Pentex™

The Power
of Partnership



Description

This is a modern explosive providing a high initiation capacity for a broad range of explosive applications. It is based on PETN and TNT, raw materials, which make it a stable and excellent load initiator for low-sensitivity and non-sensitive loads. Thus, its main characteristic is to develop high pressure.

This explosive is available in two types of boosters, *Pentex™ CD* (cylindrical booster), available in 150 g, 250 g, 450 g. and 900 g; likewise, as *Pentex™ CO* (conical booster), available in 450 g, 900 g and 1.350 g.

Application

- *Pentex™ CD* boosters are used as initiators of non-sensitive or low-sensitivity primary loads, such as nitro carbonitrates, emulsions and bulk mixes in medium and large diameter drillings.
- Boosters *Pentex™ CO* are used as explosive load in secondary blasting, thus reducing large-sized rocks produced by primary blasting.

Recommendations for use

- Use the oldest products in magazines.
- Store appropriately according to explosives and magazines regulation.

Technical properties

Density	1.60 grs/mt
VOD	>7000mts/seg
Water Resistance	Excellent, initiation after 72 hours
Minimal initiator	Detonator N° 8
Developed Heat	1231 Kcal/kg
Gasses Volume	612 Lts/kg
Strength in weight	1,28 equiv. ANFO
Strength in volume	2,75 equiv. ANFO
Colour	Orange
Shell	Polyethylene

Packaging

Cylindrical booster packaging

Type	Amount per box	Net weight in kg. per box approx.
<i>Pentex™ CD – 150</i>	130	22,9
<i>Pentex™ CD – 225</i>	100	25,7
<i>Pentex™ CD – 450</i>	50	24,7
<i>Pentex™ CD – 900</i>	20	18,0

Conical booster packaging

Type	Amount per box	Net weight in kg. per box approx.
<i>Pentex™ CO – 450</i>	40	18
<i>Pentex™ CO – 900</i>	12	10,8
<i>Pentex™ CO – 1350</i>	10	13,5

Storing and handling

Product classification

Authorized Name:	<i>Pentex™</i>
Shipping Name:	Booster, no detonator
UN No.	0042
Class Code	1.1D



www.oricaminingsservices.com

Technical Data Sheet

Pentex™

The Power
of Partnership

Storing

Store in authorized magazine at moderate temperature, low humidity and appropriate ventilation. The manufacturer guarantees the quality of the product for a two-year period if stored in appropriate conditions.

Destruction

Destruction of explosives materials can be hazardous. Methods for safe disposal of explosives may vary depending on the user's situation. Please contact a local Orica representative for information on safe practices.

Safety

- The spot at the base of *Pentex™* guarantees a reliable initiation, whichever the type of detonator assembled.
- Excellent resistance to traction, abrasion and humidity.
- Very stable explosive.

Trademarks

The word Orica, the Ring device and the Orica mark are trademarks of Orica Group Companies. *Exel™*, *Pentex™* and *Cordtex™* are trademarks of Orica Explosives Technology Pty Ltd. ACN 075 659 353, 1 Nicholson Street, Melbourne, VIC, Australia.

All information contained in this datasheet is accurate and up-to-date at publication. Since Orica cannot anticipate or control the conditions under which this information and its products may be used, each user should review the information in the specific context of the intended application. Orica will not be responsible for damages of any nature resulting from the use of or reliance upon the information in this data sheet. No express or implied warranties are given, other than those implied mandatory by law.

Orica Chile S.A. - LA PORTADA Plant

Camino a Mejillones Km. 18 Antofagasta - Chile

Telephone: +56 55 35 40 00

Fax: +56 55 25 13 22

Emergency telephones

In Chile: 9 873 47 84

Out of Chile: +56 99 873 47 84

Disclaimer



www.oricaminingsservices.com

Technical Data Sheet

The Power
of Partnership

Fortel™ Pro

Description

Fortel™ Pro packaged emulsion explosive is a robust, booster sensitive explosive. The explosive is orange in color with a firm putty-like consistency.

Application

Fortel™ Pro is a large diameter water resistant packaged explosive designed for use as a medium density column explosive in mining and general blasting work. *Fortel™ Pro* can be used to build a toe charge out of water in conjunction with an *Amex™* column charge.

Key Benefits

- *Fortel™ Pro* is a cost efficient, emulsion formulation suitable for a range of blasting applications.
- *Fortel™ Pro* improves digging and mucking efficiency in benching and other applications, even in deep holes.
- *Fortel™ Pro* is pre-compression resistant with excellent heave energy.
- *Fortel™ Pro* reduces post-blast fumes and improves turnaround time.
- *Fortel™ Pro* is highly water resistant, which minimizes leaching and reduces environmental impact.
- OH&S issues around the handling and storage of nitroglycerin are eliminated.
- The packaging and emulsion color of *Fortel™ Pro* provides high visibility in a range of environments.

Technical Properties

Fortel™ Pro 75 x 400 mm (3 x 16 in.)		
Cartridge Density		1.28 g/cc
Typical Velocity of Detonation ¹		5,200 m/s ³ 17,000 ft/s
Water Resistance		Excellent
Fume Class		2
Relative Effective Energy (REE) ²	Relative Weight Strength (RWS)	108
	Relative Bulk Strength (RBS)	165

Packaging

Fortel™ Pro is distinctively packaged in high strength, tear-resistant blue Valeron plastic film, to clearly differentiate it from detonator sensitive packaged explosives. Standard cartridge sizes are as follows:

Sizes (mm)	Sizes (in.)	Cartridges per case	Film
65 x 400	2½ x 16	12	Valeron
70 x 400	2¾ x 16	9	Valeron
75 x 400	3 x 16	8	Valeron
90 x 400	3½ x 16	6	Valeron

Recommendations for Use

Priming and Initiation

Fortel™ Pro is a booster sensitive emulsion explosive and must be in direct contact with the largest possible diameter *Senatel™* detonator sensitive explosive or an appropriately sized *Pentex™* booster. Use of detonating cord with *Fortel™ Pro* is not recommended. Detonating cord may adversely affect the performance of *Fortel™ Pro* and could result in misfires in boreholes less than 75 mm (3 in.) in diameter. Consult an Orca representative before attempting to use with detonating cord.

Charging

Cartridges may be placed into blastholes intact or, where maximum energy is required, may be slit lengthways prior to loading to achieve a higher degree of coupling. Care should be taken when loading slit cartridges into wet blastholes as the explosive could bridge at the air-water interface.

Sleep Time Within Blastholes

The sleep-time in a blasthole is influenced by the extent of damage to the packaging and by the nature of any water present. *Fortel™ Pro* will give good performance after two weeks immersion.



Fortel™ Pro

Storage And Handling

Product Classification

Authorized Name: *Fortel™ Pro*
Shipping Name: Explosive, Blasting, Type E
UN No: 0332 PG II
Class Code: 1.5D
EX Number: 2003060208

All regulations pertaining to the handling and use of such explosives apply.

Storage

Store *Fortel™ Pro* in a suitably licensed magazine for Class 1.5D explosives. The cases should be stacked in the manner designated on the case.

Fortel™ Pro has a **shelf life** of up to 12 months from date of manufacture in a well ventilated, approved magazine, even in hot and humid extremes. *Fortel™ Pro* is best stored at temperatures above 15°C (5°F).

For recommended good practices in transporting, storing, handling, and using this product, refer to the "Always and Never" booklet packed inside each case.

Transport

Fortel™ Pro should be transported between -40°C (40°F) and +40°C (104°F).

Disposal

Disposal of explosives materials can be hazardous. Methods for safe disposal of explosives may vary depending on the user's situation. Please contact a local Orica representative for information on safe practices.

Safety

The post detonation fume characteristics of *Fortel™ Pro* make the product suitable for both underground and surface blasting applications. Users should ensure that adequate ventilation is provided prior to re-entry into the blast area.

Fortel™ Pro can be initiated by extremes of shock, friction or mechanical impact. As with all explosives, *Fortel™ Pro* should be handled and stored with care and must be kept clear of flame and excessive heat.

Trademarks

The word Orica, the Ring device and the Orica mark are trademarks of Orica Group Companies. *Fortel™*, *Amex™*, *IDeX™*, *Pentex™*, and *Senatel™* are trademarks of Orica Explosives Technology Pty Ltd. ACN 075 659 353, 1 Nicholson Street, East Melbourne, VIC, Australia.

Disclaimer

The information contained herein is based on experience and is believed to be accurate and up to date as at the date of its preparation. However, uses and conditions of use are not within the manufacturer's control and users should determine the suitability of such products and methods of use for their purposes. Neither the manufacturer nor the seller makes any warranty of any kind, express or implied, statutory or otherwise, except that the products described herein shall conform to the manufacturer's or seller's specifications. The manufacturer and the seller expressly disclaim all other warranties, INCLUDING, WITHOUT LIMITATION, WARRANTIES CONCERNING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Under no circumstances shall the manufacturer or the seller be liable for indirect, special, consequential, or incidental damages without limitation, damages for lost or anticipated profits. Explosives based on Ammonium Nitrate such as *Fortel™ Pro* may react with pyritic materials in the ground and create potentially hazardous situations. Orica accepts no responsibility for any loss or liability arising from use of the product in ground containing pyritic or other reactive material.

Explosivos Mexicanos S.A. de C.V.

Prolongación Fertilizantes #1800 Col. Industrial C.P. 25760
Monclova, Coahuila México
Office: + (52 866) 631 – 1011
Fax: + (52 866) 631 – 4266



Technical Data Sheet

The Power
of Partnership

Fortel™ Pro

Emergency telephones

In Mexico 01-800-002-1400

01-555-559-1588

Cellular 045-866-638-5125

Out of Mexico 52-555-559-1588

Cellular 52-1-866-638-5125

Notes

1. VOD will depend on application including explosive density, blasthole diameter and degree of confinement. The VOD range is based on minimum unconfined and calculated ideal.
2. The "Relative Effective Energy (REE) of an explosive is the energy calculated to be available to do effective blasting work. All energy values are calculated using the *IDeX™* computer code owned by Orica for the exclusive use of its companies. Energy values are based on standard ANFO with a density of 0.84 g/cc and a cut-off pressure of 100Mpa. Other computer codes may give different values.
3. Unconfined at 5°C (41°F)

Fortel Pro



V5 March 2008
Page 3 of 3



www.oricamining services.com

Technical Data Sheet

ElectricMS™

Short Delay, Electric Detonator Assembly

The Power
of Partnership

Emergency Contact Telephone Numbers

For chemical emergencies (24 hour) involving transportation, spill, leak, release, fire or accidents:

Canada: Orica Canada emergency response **1-877-561-3636**

USA: Chemtrec **1-800- 424-9300**

For lost, stolen or misplaced explosives:

USA: BAFT **1-800-800-3855**. Form ATF F5400.0 must be completed and local authorities (state / municipal police, etc) must be advised.

Orica Canada Inc.
301 Hotel De Ville
Brownsburg, QC J8G 3B5
Tel: +1 303 268 5000
Fax: +1 303 268 5250

Orica USA Inc.
33101 East Quincy Ave
Watkins, CO 80137
Tel: +1 303 268 5000
Fax: +1 303 268 5250

Technical Data Sheet

The Power
of Partnership

Senatel™ Magnafrac™



Description

Senatel™ Magnafrac™ packaged emulsion explosive is a robust, detonator sensitive explosive. The explosive is orange in color with a firm putty-like consistency. This product is also available in High Wax (HW) formulations.

Application

Senatel™ Magnafrac™ is a water resistant packaged explosive designed for priming applications, and as a medium density column explosive, in mining, quarry and construction, and general blasting work. The high detonation velocity and the robust nature of Senatel™ Magnafrac™ make it an ideal primer for the initiation of ANFO columns.

Senatel™ Magnafrac™ PMP film cartridges readily split during tamping to maximize coupling and bulk strength within a blasthole.

Key Benefits

- Senatel™ Magnafrac™ is a cost effective emulsion formulation suitable for a range of blasting applications.
- Senatel™ Magnafrac™ reduces post-blast fumes and improves turnaround time.
- Senatel™ Magnafrac™ can be loaded into 115 mm (4½ in.) diameter upholes when used with cartridge loading equipment.
- The tight diameter control specifications and wax formulation of Senatel™ Magnafrac™ maximizes cartridge loader performance.
- Senatel™ Magnafrac™ is highly water resistant that minimizes leaching and reduces environmental impact.
- OH&S issues around the handling and storage of nitroglycerin are eliminated.
- Provides excellent fragmentation with minimum throw.
- Packaged in PMP, easy to tamp plastic film or high strength, tear resistant Valeron film cartridges ideal for ragged, medium size boreholes.

- The packaging and emulsion color of Senatel™ Magnafrac™ provides high visibility in a range of environments.

Technical Properties

Senatel™ Magnafrac™ 32 x 400 mm (1 ¼ x 16 in.)		
Cartridge Density		1.11 g/cc
Velocity of Detonation ¹		5,000 m/s ³ 16,400 ft/s
Water Resistance		Excellent
Fume Class		1
Relative Effective Energy (REE) ²	Relative Weight Strength (RWS)	91
	Relative Bulk Strength (RBS)	120

Packaging

Senatel™ Magnafrac™ is packaged in white plastic film to clearly differentiate it from booster sensitive packaged explosives. Cartridges are packed into 25 kg (55 lb) fiberboard cartons. Standard cartridge sizes are as follows:

Sizes (mm)	Sizes (in.)	Nominal count per case	Film Type
25 x 300	1 x 12	161(±6)	PMP
28 x 300	1 ⅛ x 12	120(±4)	PMP
28 x 400	1 ⅛ x 16	94(±4)	PMP
32 x 300	1 ¼ x 12	104(±4)	PMP
32 x 400	1 ¼ x 16	80(±4)	PMP
40 x 400	1 ½ x 16	51(±4)	PMP
45 x 200	1 ¾ x 8	73(±3)	PMP / Valeron
50 x 200	2 x 8	57(±2)	Valeron
50 x 400	2 x 16	26	Valeron
65 x 200	2 ½ x 8	34	Valeron
75 x 400	3 x 16	12	Valeron



Senatel™ Magnafrac™

Recommendations for Use

Blasthole Depth

Senatel™ Magnafrac™ is suitable for use in holes of any practical depth providing contained water does not exceed 20 m (65.6 ft.) depth.

Priming and Initiation

An Orica high strength electric, electronic, or non-electronic detonator can reliably initiate *Senatel™ Magnafrac™* at temperatures higher than -15°C (5°F). At temperatures below -15°C (5°F), an appropriately sized *Pentex™* Booster is recommended. Use of detonating cord with *Senatel™ Magnafrac™* is not recommended. Detonating cord may adversely affect the performance of *Senatel™ Magnafrac™* and could result in misfires. Consult an Orica representative before attempting to use with detonating cord.

Charging

In small diameter blastholes the maximum energy per meter of blasthole can be achieved by tamping the explosive with a wooden tamping rod appropriate to the hole diameter. No metal instrument should be used to tamp explosives. The primer cartridge containing a detonator must not be tamped.

Sleep Time Within Blastholes

The sleep time in a blasthole is influenced by the extent of damage to the packaging and by the nature of any water present. *Senatel™ Magnafrac™* will give good performance after two weeks immersion.

Storage And Handling

Product Classification

Authorized Name: *Senatel™ Magnafrac™*
Shipping Name: Explosive, Blasting, Type E
UN No: 0241 PGII
Class Code: 1.1D
EX Number: 2008020491

All regulations pertaining to the handling and use of such explosives apply.

Storage

Store *Senatel™ Magnafrac™* in a suitably licensed magazine for Class 1.1D explosives. The cases should be stacked in the manner designated on the case.

Senatel™ Magnafrac™ has a storage shelf life of up to 12 months from manufacture date in a well ventilated, approved magazine, even in hot and humid extremes.

Senatel™ Magnafrac™ is best stored at temperatures above -15°C (5°F). This is especially important in cold weather "load and shoot" worksites where there is insufficient inhole warm-up time. *Senatel™ Magnafrac™* should have an internal temperature of 0°C (32°F) or higher, before use with a pneumatic cartridge loading machine.

For recommended good practices in transporting, storing, handling, and using this product, refer to the "Always and Never" booklet packed inside each case.

Transport

Senatel™ Magnafrac™ should be transported between -15°C (5°F) and +30°C (86°F).

Disposal

Disposal of explosives materials can be hazardous. Methods for safe disposal of explosives may vary depending on the user's situation. Please contact a local Orica representative for information on safe practices.

Safety

The post detonation fume characteristics of *Senatel™ Magnafrac™* make the product suitable for both underground and surface blasting applications. Users should ensure that adequate ventilation is provided prior to re-entry into the blast area.

Senatel™ Magnafrac™ can be initiated by extremes of shock, friction or mechanical impact. As with all explosives, *Senatel™ Magnafrac™* should be handled and stored with care and must be kept clear of flame and excessive heat.



Senatel™ Magnafrac™

Trademarks

The word Orica, the Ring device and the Orica mark are trademarks of Orica Group Companies. *Senatel™*, *Magnafrac™*, *Pentex™*, and *Idex™* are trademarks of Orica Explosives Technology Pty Ltd. ACN 075 659 353, 1 Nicholson Street, East Melbourne, VIC, Australia.

Disclaimer

The information contained herein is based on experience and is believed to be accurate and up to date as at the date of its preparation. However, uses and conditions of use are not within the manufacturer's control and users should determine the suitability of such products and methods of use for their purposes. Neither the manufacturer nor the seller makes any warranty of any kind, express or implied, statutory or otherwise, except that the products described herein shall conform to the manufacturer's or seller's specifications. The manufacturer and the seller expressly disclaim all other warranties, INCLUDING, WITHOUT LIMITATION, WARRANTIES CONCERNING MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Under no circumstances shall the manufacturer or the seller be liable for indirect, special, consequential, or incidental damages without limitation, damages for lost or anticipated profits. Explosives based on Ammonium Nitrate such as *Senatel™ Magnafrac™* may react with pyritic materials in the ground and create potentially hazardous situations. Orica accepts no responsibility for any loss or liability arising from use of the product in ground containing pyritic or other reactive material.

Explosivos Mexicanos S.A. de C.V.

Prolongación Fertilizantes #1800 Col. Industrial C.P. 25760

Monclova, Coahuila México

Office: + (52 866) 631 – 1011

Fax: + (52 866) 631 – 4266

Emergency telephones

In Mexico 01-800-002-1400

01-555-559-1588

Cellular 045-866-638-5125

Out of Mexico 52-555-559-1588

Cellular 52-1-866-638-5125

Notes

1. VOD will depend on application including explosive density, blasthole diameter and degree of confinement. The VOD range is based on minimum unconfined and calculated ideal.
2. The "Relative Effective Energy (REE) of an explosive is the energy calculated to be available to do effective blasting work. All energy values are calculated using the *IDeX™* computer code owned by Orica for the exclusive use of its companies. Energy values are based on standard ANFO with a density of 0.84 g/cc and a cut-off pressure of 100Mpa. Other computer codes may give different values.
3. Unconfined at 5°C (41°F).



Technical Data Sheet Cordtex™

The Power
of Partnership



Description

Resistant and flexible detonating cord, made of a PETN core covered by a fiber fabric, that is also covered by another plastic coating (*Cordtex™ P*) or wax coating (*Cordtex™ W*). The *Cordtex™* detonating cord meets most requirements of mines, quarries and civil works.

Application

This product can be used in open pit mining, underground mining, quarries and civil works. Its main functionalities are connecting blasting as trunk lines, initiating non-electric detonators and is used in descending lines.

Their benefits include:

- Excellent resistance to traction, abrasion and humidity.
- Safe and easy to connect product.

Recommendations for use

- When using the detonating cord in blasting, the laying of the trunk line should complete a closed circuit, in

order to allow all connected boreholes to receive the initiation signal from two different directions.

- Use the product that has been stored longer.
- When the detonating cord is connected through knots (descending lines connected to trunk lines), the knot connection should make a right angle.
- When connecting an *Exel™* detonator to *Cordtex™* detonating cord, a "J" Connector should be used to assure the detonator is firmly joined to the detonating cord in a right angle.

Technical properties

Cordtex™ P and *Cordtex™ W* detonating cords are available in the following grams:

Name	Nominal load (gr/m)	Colour
<i>Cordtex™ W</i>		
<i>Cordtex™ 3,6W</i>	3,6	Pink
<i>Cordtex™ 5W</i>	5,0	Yellow
<i>Cordtex™ 5W UG</i>	5,0	Yellow
<i>Cordtex™ 10W</i>	10,0	Red
<i>Cordtex™ P</i>		
<i>Cordtex™ 3,6P</i>	3,6	Orange
<i>Cordtex™ 5P</i>	5,0	Green
<i>Cordtex™ 10P</i>	10,0	Red
<i>Cordtex™ 42P</i>	42,0	Orange
<i>Cordtex™ 70P</i>	70,0	Green



www.oricamining services.com

Technical Data Sheet

Cordtex™

The Power
of Partnership

Packaging (amount per box)

Cordtex™ P and *Cordtex™ W* is available in the quantity per box indicated in the following table:

Name	Nominal load (gr/m)	Spool Unit/box	Classification Code 1.1D	
			m/box	kg/box
Cordtex™ W				
Cordtex™ 3,6W	3,6	2/500	1000	13,5
Cordtex™ 5W	5,0	2/500	1000	15,3
Cordtex™ 5W UG	5,0	2/250	500	7,5
Cordtex™ 10W	10,0	2/350	700	15,8
Cordtex™ P				
Cordtex™ 3,6P	3,6	2/900	1800	16
Cordtex™ 5P	5,0	2/700	1400	16
Cordtex™ 10P	10,0	2/500	1000	18
Cordtex™ 42P	42,0	2/150	300	18
Cordtex™ 70P	70,0	2/50	100	14

Storing and handling

Product classification

Authorized Name: *Cordtex™*
 Shipping Name: Detonating Cord
 UN No. 0065
 Class Code 1.1D

Storing

Store in authorized magazine at moderate temperature, low humidity and appropriate ventilation. The manufacturer guarantees the quality of the product for a two-year period if stored in appropriate conditions.

Destruction

Destruction of explosives materials can be hazardous. Methods for safe disposal of explosives may vary depending on the user's situation. Please contact a local Orica representative for information on safe practices.

Safety

Cordtex™ detonating cord presents low sensitivity to early or accidental detonation due to heat, impact, friction electric discharges or other conditions that generally come about in mining sites; however, it is advisable not to subject it to conditions other than those specified by the manufacturer.

Trademarks

The word Orica, the Ring device and the Orica mark are trademarks of Orica Group Companies. *Exel™*, *Pentex™* and *Cordtex™* are trademarks of Orica Explosives Technology Pty Ltd. ACN 075 659 353, 1 Nicholson Street, Melbourne, VIC, Australia.

Disclaimer

All information contained in this datasheet is accurate and up-to-date at publication. Since Orica cannot anticipate or control the conditions under which this information and its products may be used, each user should review the information in the specific context of the intended application. Orica will not be responsible for damages of any nature resulting from the use of or reliance upon the information in this data sheet. No express or implied warranties are given, other than those implied mandatory by law.

Explosivos Mexicanos S.A. de C.V.

Prolongación Fertilizantes #1800 Col. Industrial C.P. 25760
 Monclova, Coahuila México
 Office: + (52 866) 631 – 1011
 Fax: + (52 866) 631 – 4266

Emergency telephones

In Mexico 01-800-002-1400
 01-555-559-1588
 Cellular 045-866-638-5125
 Out of Mexico 52-555-559-1588
 Cellular 52-1-866-638-5125



www.oricaminingsservices.com